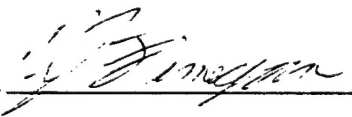NAVAL WAR COLLEGE
Newport, R.I.

Organizational Implications of Network-Centric Warfare
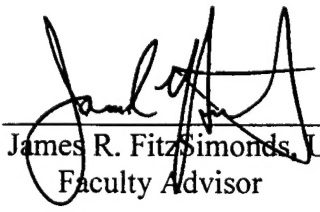
By

Richard J. Finnegan
Lieutenant Commander, United States Navy

A paper submitted to the Faculty of the Naval War College in partial satisfaction of the
requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily
endorsed by the Naval War College or the Department of the Navy.

Signature: _____

5 February 1998

Captain James R. FitzSimonds, U.S. Navy
Faculty Advisor

19990520 086

Abstract of

ORGANIZATIONAL IMPLICATIONS OF NETWORK-CENTRIC WARFARE

One of the many proposed responses to the rapidly changing global environment and significant fiscal constraints at the onset of the information age has been the concept of network-centric warfare. The proponents of the concept draw support from successes achieved by high-tech segments of the business world that have embraced advances in information technology.

At issue is not whether or not the Navy (and other services) will seek to exploit information technology to the fullest extent possible. Indeed examples of the Navy's quest to distribute information in a graphic network format actually predate the end of the Cold War by decades. What is controversial is the extent to which the introduction of advanced information technology will change the hierarchical system of human interaction that has dominated successful military organizations for thousands of years.

Before we decide our course we must examine the likely political realities of tomorrow's conflicts, the characteristics of "current versus proposed" force profiles and most importantly the influence of todays business practices on military affairs.

THE CONTROVERSY

In today's increasingly budget conscious defense establishment Network-centric warfare is rapidly building momentum and consensus among the leadership as the American methodology for the conduct of future military conflicts. Its origins are deeply rooted in the ongoing "revolution in military affairs" and as a result it embodies some of the current trends commonly found in business organization and management publications. Like any new program or plan it must justify its projected expense by promising vast potential improvements in combat power, while providing the opportunity to eliminate as many of the costly systems in today's inventory as possible.

The foundation upon which the network-centric concept stands maintains that the degree of uncertainty in the future operational environment will be so great that traditional systems of deliberate or crisis action planning are predicted to be sub-optimal for generating viable solutions within acceptable time constraints. The concept remains to be refined in depth however. In present form it derives its strength from the exploitation of present and future information technology capabilities to gain a commanding competitive advantage with respect to the time required to complete the observe-orient-decide-act (OODA) loop. The overarching goal is to compress the time required to complete the cycle by enhancing "observe and orient", reducing or eliminating the requirement for "decide" (at the operational level) and automating "act" in such a manner that one's adversary is unable to keep up the pace with his C4I resources. According to Vice Admiral Cebrowski, "It is characterized by the decisive altering of initial conditions, the development of high rates of change, and locking in

success while locking out alternative enemy strategies."[1] The competitive advantage attained through quickness when applied in conjunction with long-range precision weapons is calculated to retain the "potential, within limits, to offset a disadvantage in numbers, technology, or position."[2]

Network-centric warfare is projected to be the enabler of a future Navy that "grows quicker, cheaper, and better."[3] (As previously noted "cheaper" might be one of the overriding considerations). This new Navy will base it's power on quick shock tactics designed to overwhelm the enemy by striking critical assets rapidly in the initial phases of a conflict making further resistance futile (from the prospective of western culture). Admiral Reason (CINCLANTFLT) feels that,

> "Advanced information technology and better information will enable much more accurate targeting and weapon guidance...Naval forces will not need as many pieces of ordnance to provide the requisite explosive power for target destruction....combatant ships will be carrying what they need for the fight...there will be a less critical requirement for replenishment ships to haul ammunition...Navy ships will be cheaper and simpler, more lightly manned...as components of a larger force dispersed over a wide area...such a force avoids the risk of presenting a few expensive, massive targets to WMD."[4]

Simply put, as ever increasing technological sophistication, speed, range and maneuver are incorporated within the "round" it is postulated that these same qualities can be removed from the ship that carries (fires) the round. While this initially appears appealing from the perspective of economy it certainly bodes poorly for the survivability

---

[1] VADM. Aurthur K. Cebrowski, USN and John J. Garska, "Network-Centric Warfare: Its origin and Future," U.S. Naval Institute Proceedings, January 1998, 32.

[2] Ibid., 32.

[3] ADM J. Paul Reason and David G. Freymann. "Newport Paper Number Thirteen: Sailing New Seas." NWC Press. <http://www.nwc.navy.mil/press/npapers/np13/np13pt1.htm/> (20 November 1998).

of the individual units endowed with less speed, maneuverability, and sophistication. At the very least their ability to operate (survive) independently, outside the umbrella of the network, would be severely limited. In addition, historical record would seem contrary to the suggested inverse relationship between the technology of the weapon and the simplicity (expense) of the platform from which it is launched. For example, the development of virtually independent "fire and forget" acoustic homing torpedoes and tomahawk missiles certainly did not in any way decrease the complexity of the ships from which they are launched. Again, proponents insist that the "new technology" is so radically different and advanced that the lessons of the past are not applicable and hence irrelevant.

A networked organization structure is thought to be the only engine capable of powering this new force; giving it the speed necessary to dominate this style of combat, to identify, track and destroy (perhaps neutralize more accurately reflects the intent) an enemies Center of Gravity (COG) within a very compressed timeframe. VADM Cebrowski insists, "When 50% of something important to the enemy is destroyed at the outset, so is his strategy. That stops wars-which is what network-centric warfare is all about."[5] Perhaps this is true but, is it universally applicable across all cultures? What options will remain for the force of the future should it prove invalid?

There is little if any disagreement with the concept that more capable and efficient sensor and information distribution systems will greatly improve any force's warfighting ability. Such has been the goal of every military commander in the history of conflict.

---

[4] Ibid.
[5] VADM Cebrowski, 32.

3

There does however, exist within the Navy significant controversy over the implications of the proposed Network-centric concept for the organizational structure, along with concern over a perceived over-dependence on speed and technological advantage. Should (can) a military fighting force be successfully organized as a true network in which self-synchronization, synergy and speed of action replace the traditional hierarchy characterized by deliberate planning, experience and command and control? Will this new system prove effective across the entire spectrum of conflict, or do its proponents simply wish away and ignore the hard spots? Novelist Saul Bellow put it best when he noted our frustration in the Vietnam war, "Americans as a whole were unpracticed in introspection, badly equipped to deal with opponents whom they could not undo in daring, or dispatch like big game."[6] In Vietnam it was believed that simple attrition of the enemy through the application of overwhelming raw combat power and superior technology (with little regard for strategy or operational art) would bring about victory when the enemy could no longer meet the demand for replacements. In all fairness the military and civil leaders of the day cannot be accused of shortsightedness (or oversimplification of the problem) when one considers the technology fascination that prevailed in American society. Today, many theorize that a technologically superior networked organization endowed with blinding speed (with little regard for strategy or operational art) should replace hierarchical command systems that are not sufficiently "responsive" to compete in the information age. Admiral Reason believes, "By that criterion, (responsiveness) Industrial Age systems of highly structured and centralized command and control are inadequate at the edge of chaos. They are too slow, too

---

[6] Christopher Coker, <u>War and the 20th Century: A Study of Modern Consciousness</u> (London: Brassey's 1994), 246.

vulnerable, insufficiently agile, and unable to collect and process all the relevant information they need."[7] He then goes on to forecast, "The industrial age organizations vertical decision structure, with its concentration of power at the top cannot quickly digest the data and information provided it. As a result, it responds too slowly, and too often inappropriately. By it's very nature it is condemned to be inadequately efficient and effective in the evolving environment."[8]

The challenge for today's leaders is to determine what organizational structure along the continuum from hierarchy to network will provide the optimum capability in light of the realities of tomorrow's information rich operational environment. In the conduct of this examination it is important to keep in mind the premise upon which the Navy and all the armed services operate. The source of power is "concentrated at the top" under the auspices of the country's civilian leadership. Whatever organization evolves it must possess the in-process flexibility and accountability requirements of the customer, in this case the National Command Authority.

THE BATTLEFIELD OF TOMORROW

The abundance of theories and forecasts pertaining to the conduct of future conflicts defies any attempt at comprehensive description. Regardless of the size, shape, or composition of future forces it is possible to make several predictions about the characteristics of the global environment in which they will operate in the coming decades.

---

[7] ADM Reason, 3.
[8] Ibid., 4.

1. The sensitivity of the political environment in which we operate will increase even more in the future. By taking advantage of the proliferation of advanced communications technology adversaries can be expected to vigorously exploit any action, mistake or incident in order to influence domestic and world public opinion. It has already been clearly demonstrated how the influence of the media can cause resolve to vaporize and coalitions to crumble. "By dragging the body of a U.S. soldier through the streets of Mogadishu the Somalis were able to destroy public support upon which the United States and other Western democracies depend upon to sustain military operations."[9] Some would contend that it was only the administration's will that had been eroded (through public embarrassment and political pressure) but, in either case the end result was the same. The NCA will expect a thoughtful examination and risk analysis concerning this type of effect prior to the commencement of future operations. Without a well developed concept of operations (a plan) it will be impossible for the network-centric commander to provide anything other than very general statistical analysis.

2. Improvements in network and broadband, high-data-rate communications systems will facilitate the capability for the National Command Authority to have an unprecedented awareness of the operational and tactical situation. It will be possible to track in real time the position and status of individual combat units and communicate directly with them.

3. The continued growth of IW and the proliferation of commercial space and communications assets capable of collecting useful military intelligence will place sensitive information in the hands of anyone with the financial resources to obtain it.

---

[9] Charles J. Dunlap, "Preliminary observations: Asymmetrical Warfare and the Western Mindset," in Challenging The United States Symmetrically and Asymmetrically: Can America Be Defeated? ed. Lloyd J. Matthews (Carlisle Barracks, Pennsylvania: U.S. Army War College Strategic Studies Institute, 1998), 7.

Prior to Desert Storm the Iraqi's were able to obtain at minimal cost a complete understanding of the coalition IPB regarding their preplanned SCUD launch sites. Armed with this information they were able to make appropriate adjustments and avoid the loss of this strategic asset.

4. There will always be some "black" programs but many feel, "it is unlikely that the openness of democratic societies will allow the achievement of an asymmetrical advantage via technological surprise."[10] Future adversaries will emphasize redundancy, deception, mobility and decentralization as cheap but effective low-tech counters to technology, speed and long range precision weapons.

5. The competition generated by the information age's emphasis on human resources and intellectual capital will continue the trend toward high turnover rates in junior and mid-grade personnel that the Navy is currently experiencing (approximately one sixth of the force is replaced every year). This condition, a fact of life for military leaders, could not be tolerated by any truly network oriented organization in today's business world. The sailors that man our ships and aircraft will have sufficient technical training to perform specialized functions but a more limited understanding of operational art and strategic objectives. In order to facilitate their "self-synchronization" they will need to be provided a set of complex decision rules. The volume of decision rules may indeed grow cumbersome as leaders attempt to compensate for the myriad of variables at work on the modern battlefield.

6. "Despite the fact that the RMA has undoubtedly accelerated the speed at which information travels and the amount of information available to commanders, it has not

REPORT DOCUMENTATION PAGE

1. Report Security Classification: UNCLASSIFIED	

2. Security Classification Authority:

3. Declassification/Downgrading Schedule:

4. Distribution/Availability of Report: DISTRIBUTION STATEMENT A: APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED.

5. Name of Performing Organization:
JOINT MILITARY OPERATIONS DEPARTMENT

6. Office Symbol: C	**7. Address:** NAVAL WAR COLLEGE 686 CUSHING ROAD NEWPORT, RI 02841-1207

8. Title (Include Security Classification):
ORGANIZATIONAL IMPLICATIONS OF NETWORK-CENTRIC WARFARE (UNCLASSIFIED)

9. Personal Authors: LCDR FINNEGAN, RICHARD J., USN

10. Type of Report: FINAL	**11. Date of Report:** 5 FEBRUARY 1998

12. Page Count: 23 (INCLUDING RPT DOC FM, COVER AND ABSTRACT)

13. Supplementary Notation: A paper submitted to the Faculty of the NWC in partial satisfaction of the requirements of the JMO Department. The contents of this paper reflect my own personal views and are not necessarily endorsed by the NWC or the Department of the Navy.

14. Ten key words that relate to your paper: Network-centric, future, organization, structure, business, hierarchy, network, technology, RMA, C4I.

15. Abstract:

     One of the many proposed responses to the rapidly changing global environment and significant fiscal constraints at the onset of the information age has been the concept of network-centric warfare. The proponents of the concept draw support from successes achieved by high-tech segments of the business world that have embraced advances in information technology.

     At issue is not whether or not the Navy (and other services) will seek to exploit information technology to the fullest extent possible. Indeed examples of the Navy's quest to distribute information in a graphic network format actually predate the end of the Cold War by decades. What is controversial is the extent to which the introduction of advanced information technology will change the hierarchical system of human interaction that has dominated successful military organizations for thousands of years.

     Before we decide our course we must examine the likely political realities of tomorrow's conflicts, the characteristics of "current versus proposed" force profiles and most importantly the influence of todays business practices on military affairs.

16. Distribution / Availability of Abstract:	Unclassified X	Same As Rpt	DTIC Users

17. Abstract Security Classification: UNCLASSIFIED

18. Name of Responsible Individual: CHAIRMAN, JOINT MILITARY OPERATIONS DEPARTMENT

19. Telephone: 841-6461	**20. Office Symbol:** C

appreciably quickened strategic and political decision making. The political process, especially in a large democracy is intended to be slow moving and can be expected to remain so"[11] Operational commanders have never had, and should not expect to have in the future, complete independence from the influence of civilian leadership. Politicians will continue to demand thorough knowledge of any planned course of action prior to it's execution.

THE HIERARCHY

Many theorists describe the evolution (or revolution) of various systems of organization in terms of various "ages" or "waves". A system that may dominate in one age (the industrial age for example) is theorized to be sub-optimal or even completely ineffective in the next (information age). Thus assumptions are often made by many business and military authorities that the modern hierarchy, a product of the industrial age, is inappropriate for the information age. An alternate approach might be to consider that the "hierarchy" (actually an innovation of the agrarian age) successfully negotiated the transition from the "agrarian" to the "industrial" age and well might remain dominant in the information age. Examples of well-defined hierarchical military organizations are prolific in the agrarian age, the most familiar being that of the Roman legions nearly two thousand years ago. "Such features as uniforms, rank insignia, tables of organization and equipment, division into subsidiary units, close order drill, individual-level training in

---

[10] Ibid., 9.

[11] Stephen J. Blank, "How We Will Lose The Next War With Russia: A Critique of U.S. Military Strategy," in Challenging The United States Symmetrically and Asymmetrically: Can America Be Defeated? ed. Lloyd J. Matthews (Carlisle Barracks, Pennsylvania: U.S. Army War College Strategic Studies Institute, 1998), 276.

combat skills, an elaborate division of labor on the battlefield and tactical manuals-all regarded today as defining characteristics of military organizations, were first introduced and systematized by the Romans."[12] The basic concepts and principles developed then have been continuously refined, remaining viable throughout the entire industrial age and even now as we transition to the information age. Countless innovations in weapons and communications technology have come and gone and yet this system of human interaction continues to dominate the preponderance of military and business organizations. "Companies also should be aware that, in some respects, after 50,000 years of human existence there is not much new about the ways humans organize. Thus the breathless imperatives of corporate-structure consultants must be tempered by the long view: The Egyptians were talking about decentralization in 2600 BC; China in 1 AD created organizations around processes. Most companies recognize that some structural order and accountability is necessary for companies to succeed."[13] In his book, The ART of Strategic Planning For information Technology, Bernard A. Boar of AT&T (a company that has staked it's future on networking) professes that the new "team" standard "resembles more an orchestra of skilled musicians than a traditional, hierarchical military command structure."[14] He then however, goes on to recommend a classic hierarchical corporate structure in which the information movement and management (IM&M) officer is a functional VP with a series of subordinate directors including; development, operations, support, staff functions, desktop systems etc. The dichotomy is

---

[12] Theodore Caplow and Louis Hicks, Systems of War and Peace (Lanham MD: University Press of America, Inc., 1995), 81.

[13] Mark L. Goldstein. "Making The Modern Model" Industry Week. 21 September 1998. Academic Universe/Document. Lexis-Nexis. Penton/IPC. (30 December 1998).

[14] Bernard H. Boar, The Art of Strategic Planning For Information Technology (New York: John Wiley & Sons, Inc. 1993), xii.

puzzling, the hierarchy continues to thrive and yet it is no longer in vogue to acknowledge its existence.

One of the primary advantages of the hierarchy is its standardization. This feature facilitates a certain internal predictability allowing an organization to assimilate large numbers of new personnel to remain effective with high turnover or in the event of casualties. This attribute will be of utmost importance if today's human resource trends continue. Unit structure is predictable and repetitive allowing interchangeability and facilitating task organization of groups of units. Knowledge, techniques and experience gained from past endeavors is retained by the senior personnel and passed to the lower echelons of the organization often in an informal manner. The goal is centralized planning with decentralized execution.

Authority for independent action can be delegated downward in the organization but responsibility cannot. A commander is always held responsible for the outcome regardless of whether a flawed decision was his own or that of a subordinate. To increase the chances for success (prevent mistakes) the commander furnishes subordinates with guidance in the form of ROE, tactical decision aides, administrative procedures, etc. As the organization grows and a commanders ability to supervise is impaired (by geography, communication, or sheer numbers) additional layers are inserted in the organization. These additional layers enable communication and processing of vast quantities of information but the opportunity for a disconnect between the intent of the commander and the actions of the "trigger-puller" increase proportionally. Thus from the commander's perspective it is advantageous to have the fewest layers and the "flattest" organization possible.

10

In his article "Moving The Navy Into the Information Age" Commander Loescher describes operational "omniscience and telepathy", in short the capability to sense and model all relevant information combined with the capability to convey the processed knowledge to the frontline units in a timely manner.[15] If it is possible to achieve this omnipotence through technology, human nature could (and probably would) dictate it's application in the form of a "hierarchical nirvana". Only one level of command would be necessary with technology compensating for human span of control limitations. That commander would exercise direct personal control of all units participating in an operation obviously at the expense of self-synchronization and empowerment originally envisioned. At this point the requirement for judgement/independent decision making allowed on part of unit commanders would be limited and the synergistic effect advertised in the network-centric "brochure" would never materialize.

One of the benefits of the modern hierarchy (the operational chain of command) is its ability to insulate the operators from the high degree of uncertainty that often prevails at the highest levels of the organization. Not all the instruction that starts at the top is passed to the lowest levels of the organization. The personnel who man the intermediate echelons, experienced operators themselves, may detect flaws or potential problems and either modify the plan or recommend an alternate course of action. This optimizes the efficiency of the lowest functional levels allowing for their concentration on daily operations while centralized longer range planning is conducted by dedicated staffs at a higher echelon.

---

[15] Commander Michael S. Loescher, USN (Retired), "Moving The Navy Into The Information Age," U.S. Naval Institute Proceedings, January 1999, 43.

When not properly managed a hierarchy can become overly regimented, notoriously slow and cumbersome. Operational, functional, and contingency plans are laboriously prepared, chopped and reshaped up and down the chain in an effort to purge errors and minimize risk prior to execution. While the process can obviously be streamlined when a crisis situation is perceived many of the mundane, seemingly less pressing decisions can linger in the system for years before being finalized and executed. This is often exacerbated by poor lateral communications at the appropriate levels within the organization, a channel that often withers in the highly competitive resource limited peacetime environment. Frustration with the pace of the process and the multitude of decision points it contains can often make the organization itself a target for reform especially during times of fiscal stress. As Seth Cropsey, former Principal Deputy Assistant Secretary of Defense for Special Operations and Low Intensity Conflict, pointed out, "In the government-especially the military-dwindling budgets have traditionally stimulated a free-for-all between and among the services that rewards the bureaucratically adept and ends only when resources once again start to flow."[16]

THE NETWORK

In the environment of uncertainty in which we live the networked organization is thought to hold the key to success. The network organization is difficult for most of us to understand because there are few successful examples that exist for us to study. Captain Berger in his 1997 thesis on "Organizational Innovation and Redesign in the Information Age" suggests the fashion industry and criminal organizations such as drug cartels to be

---

[16] Seth Cropsey, "The Limits of Jointness," <u>Joint Force Quarterly</u>, Summer 1998, 29.

some of the more obvious examples.[17] These organizations are innovative, flexible, exhibit shared goals, focus on core competencies, and are difficult to counter. Both organizations thrive in an environment of uncertainty. Drug cartels must constantly innovate in the face of constant threat from legitimized law enforcement activities. Their members are loosely associated and widely dispersed geographically. This amorphous structure compounds the problem of law enforcement in that critical nodes are more difficult to identify (if they exist at all) and casualties are usually isolated to a few individuals. Creativity is enhanced because individuals are not bound by doctrine and are free to innovate or experiment with new techniques for obtaining, transporting and marketing their product. Failures may have dire consequences for a small segment of the organization but as a whole the cartel is relatively unaffected. Networks do come with certain weaknesses in that they tend to drift, are inefficient, ambiguous, conflictive and are extensively dependent on outside organizations.[18] Lack of an obligatory structure and clearly defined command relationships makes it difficult to direct the energies of the entire organization on the most pressing problems. Innovative techniques developed in one quarter might be well known throughout the organization but not universally implemented.

It is important to clarify that the networked form of organization is not about technology. Current improvements in communications technology have enhanced the performance of **both** hierarchical and network organizations but in neither case does technology dictate structure. In fact one of the biggest mistakes often made by business

---

[17] CAPT Alexander Berger, USAF, "Organizational Innovation and Redesign in the Information Age: The Drug War, Netwar, and Other Lower-End Conflict," (Unpublished Research Paper, U.S. Naval Postgraduate School, Monterey, CA:1997), 57.
[18] Ibid.

leaders today is to confuse this relationship. Ray Grenier and George Metes, co-owners of Virtual Learning Systems (Manchester, NH) summarize, "They may have invested in excellent network infrastructures and collaborative technologies: audio and video conferencing systems, document and workflow applications. They assume, having purchased the networks, that networking-collaborative work-will follow."[19]

THE INFLUENCE OF BUSINESS TODAY

Despite all the references to "networked organizations" in business literature, what actually exists in most companies today is a hierarchy organized along functional lines. Information technology has been used to improve information flow and allowed the removal of layers of processing. Horizontal communications have been improved enabling problems to be solved at the lowest possible level. In some cases teams are used in problem solving and product development but they are far from "self-synchronizing". Volumes of revolutionary literature that contain the "network" buzzwords are published annually yet when examined below the surface they seem only at best incremental improvements to hierarchical organizations. Peter Drucker, one of the first to recognize how thoroughly computer technology would transform the business world and the author of over 30 books on the art of business management sums up the trends in business today. "Management is becoming ever more fashion-conscious. Managers implement strategies like downsizing and reengineering just because they seem the thing to do. Managers are fashion-conscious because, in reality, 90% of running an organization is routine (boring). Perhaps the worst example is the emphasis on teams. It takes years to build a successful

---

[19] Rey Griner and George Metes. "Wake Up and Smell the Syzygy; Management of Computer Networks" Business Communications Review. August 1998. Academic Universe/Document. Lexis-Nexis. BRC Enterprises Inc. (30 December 1998), 2.

14

team, but companies are rushing into it and expecting instant results. In most cases teams don't even work. Teams are the right strategy for a very small number of situations."[20]

Government leaders often attempt to bend current commercial trends to fit applications in public administration. Businesses today are forming alliances with other small businesses and suppliers to bring a superior product to the customer. These alliances are fundamentally different from the contractor/sub-contractor relationships of the past. The traditional model of competitiveness is shifting to one of cooperation in which complementary products are packaged together for mutual benefit and increased marketshare.[21] As with "networking" the government seized on this "new" innovation in the 90's and sought to form it's version of corporate alliances. In our haste to capitalize however, in many cases something was lost in the translation when we attempted to apply this cooperative concept in the form of "privatization" to increase efficiency in the DOD. "Just the word privatization is used to conjure up images of private sector efficiency. Oftentimes the scenario goes like this. A government bids out a particular function to the private sector at a much-ballyhooed cost savings. Public employees are laid off, and the private firm starts doing the work under contract. Before the contract expires the government is notified that the costs for the future have escalated greatly. The government is faced with three options: (1) paying a lot more for the function; (2) bidding again (usually with weak data from the current private operator); (3) bringing the

---

[20] Brent Schlender and Peter Drucker. "Peter Drucker Takes The Long View" Fortune. 28 September 1998. Academic Universe/Document. Lexis-Nexis. The Time Inc. Magazine Company. (30 December 1998), 6.

[21] Marianne Detwiler, "Remedy Corp. Has The Formula for The New Paradigm Of Business." Entrepreneurial Edge Magazine. Fall 1997. <http://www.edgeonline.comm/archives/docs/remedy.stm/ > (29 December 1998), 8.

function back into the government."[22] In such cases enthusiastic government leaders fall short of securing an **alliance** (with implied lasting mutual benefit) and instead succeed only in purchasing or contracting a service (with something less than mutual benefit). Perhaps in this manner, through faulty interpretation, the network concept will suffer the fate of Public Private Venture (PPV) housing, a misunderstood/misapplied concept adapted in haste but, destined for disaster in the long run.

"Today almost all organizations, whether or not they acknowledge the concept of virtual operations are working in fast moving, competency- based alliances. They've downsized and outsourced and sought strategic partnerships- all in an effort to streamline their processes, cut cost and speed up their time to market."[23] One can draw parallels between this description and successful organizational modifications that have already been achieved within DOD. The geographic Combatant Commands and our system of interaction as supported and supporting commands, task organized JTFs epitomize the best cooperative ideals of today's business community. Businesses today operate in a resource constrained environment and the hierarchy has been preserved (as it has in the Navy) to prioritize the distribution and sharing of those limited resources (human, financial, production) within the organization. Networks, teams and other consensus based management techniques work best at the levels at and below which critical resources do not have to be shared. Attempts to employ these self-synchronizing, synergistic techniques above this level will quite naturally invite conflict, friction and chaos.

---

[22] George Segal and Marsha Segal. "Government Lite" Public Management. April 1998. Academic Universe/Document. Lexis-Nexis. International City-County Management Association (30 December 1998), 2.
[23] Grenier, 1.

The LAMPS MKIII helicopter (a pioneer in network capabilities) provides an excellent illustration of the need for some hierarchy in the modern Navy. This multi-mission aircraft incorporates varied sensors, weapons and a secure directional SHF data link that enable it to be a major player in electronic, surface and subsurface warfare. While capable of providing some contribution in each of these areas simultaneously the system is normally optimized to the threat by preflight configuration of expendables and the profile flown during the mission. Each of these three distinct warfare areas demands a round the clock resource intensive effort in a high threat environment. When the host ship is being employed independently or in concert with other LAMPS MKIII equipped ships the resource is plentiful. Coordination and configuration of the helicopters in response to threats is simplified due to the abundance of resources (lack of conflicting or unresourced demands). By contrast a large battle-group conducting sustained operations and spread over hundreds of square miles may only have six of these aircraft. In this situation someone must act as broker to ensure that the limited resources are properly integrated with other assets, in the most efficient manner. Without guidance (a plan) one might find all the LAMPS detachments configured to counter a perceived subsurface threat and none able to respond to an emergent surface threat. When all the variables (maintenance and operating cycles, threat configuration, position, coverage factors, etc) are considered on a large scale the prospect of successful self-synchronization is improbable at best. While this is admittedly a tactical example, it is possible to draw parallels with operational and strategic level resources (space systems, high endurance UAVs) now being developed.

CONCLUSION

The intent of this paper was not to appear counter revolutionary to the network-centric ideal. It is impossible to argue that there is no value to an increased awareness of your adversary, his intentions and the environment in which we operate. In fact efficient and reliable information systems will be essential to ensure coordination on tomorrows battlefield. There is however a danger in advocating emphasis on (in essence selling) the concept of speed and precision as a panacea, or cure-all to the wide spectrum of challenges our Navy will face in future conflicts. Before we trade off our command structure and abandon the enduring flexibility and redundancy it has traditionally provided we must consider our new course carefully. Will the future political realities allow us the full advantage of speed upon which we predicate the success our leaner future force? Is it possible or desirable for the United States to dominate the medium of the information age to the exclusion of all others? Similar policies have failed in the nuclear age and one might reasonably argue that the "knowledge" genie is already out of the bottle in today's information age. Most likely our one dimensional dependence on speed and long range precision weapons will allow our future adversaries to reverse engineer our future defeat in a manner that has never before been so predictable. There is already evidence today in the protracted nature of our conflict with Iraq that the concept of the new and improved lightning war doesn't cover all the bases even with futuristic improvements considered.

Due to the multi-mission nature of today's (and by economic necessity tomorrow's) weapons and sensor systems the hierarchy must continue to exist at the operational level and above. No other system of human interaction has the proven ability to prioritize the configuration and distribution of resources in military applications. At

the tactical level the most prudent course of action is to continue the evolution of military processes through careful application of commercially available technology to localized task specific networks. The R&D costs and risks associated with the unilateral development of a "system of systems" are unacceptable unless they can be absorbed within funds already allocated for the C4I functions. Any "excess" funds that become available should be directed towards the preservation and development of human resources including, a force structure appropriate for the present and projected operational tempo. The value of human capital is dominant, enduring and versatile in that it will (as it has in the past) shape the application of whatever technology evolves in the "Navy after Next".

BIBLIOGRAPHY

Berger, Alexander. "Organizational Innovation and Redesign in the Information Age: The Drug War, Netwar, and Other Lower-End Conflict." Unpublished Research Paper. U.S. Naval Postgraduate School, Monterey, CA:1997.

Blank, Stephen J. "How We Will Lose The Next War With Russia: A Critique of U.S. Military Strategy." in <u>Challenging The United States Symmetrically and Asymmetrically: Can America Be Defeated?</u> Edited by Lloyd J. Matthews. Carlisle Barracks, Pennsylvania: U.S. Army War College Strategic Studies Institute, 1998.

Boar, Bernard H. The Art of Strategic Planning For Information Technology. New York: John Wiley & Sons, Inc. Boar 1993.

Caplow, Theodore and Louis Hicks. <u>Systems of War and Peace.</u> Lanham MD: University Press of America, Inc., 1995.

Cebrowski, Aurthur K. and John J. Garska. "Network-Centric Warfare: Its origin and Future." U.S. Naval Institute <u>Proceedings</u>, January 1998.

Coker, Christopher. <u>War and the 20th Century; A Study of Modern Consciousness.</u> London: Brassey's 1994.

Cropsey, Seth. "The Limits of Jointness." <u>Joint Force Quarterly</u>, Summer 1998, 28-35.

Detwiler Marianne. "Remedy Corp. Has The Formula for The New Paradigm Of Business." <u>Entrepreneurial Edge Magazine.</u> Fall 1997. <http://www.edgeonline.comm/archives/docs/remedy.stm/> (29 December 1998).

Dunlap, Charles J. "Preliminary observations: Asymmetrical Warfare and the Western Mindset." in <u>Challenging The United States Symmetrically and Asymmetrically: Can America Be Defeated?</u> Edited by Lloyd J. Matthews. Carlisle Barracks, Pennsylvania: U.S. Army War College Strategic Studies Institute, 1998.

Goldstein, Mark L. "Making The Modern Model." <u>Industry Week</u>. 21 September 1998. Academic Universe/Document. <u>Lexis-Nexis</u>. Penton/IPC. (30 December 1998).

Griner, Rey and George Metes. "Wake Up and Smell the Syzygy; Management of Computer Networks" <u>Business Communications Review</u>. August 1998. Academic Universe/Document. <u>Lexis-Nexis</u>. BRC Enterprises Inc. (30 December 1998).

Loescher, Michael S. "Moving The Navy Into The Information Age." U.S. Naval Institute <u>Proceedings</u>, January 1999.

Reason, Paul and David G. Freymann. "Newport Paper Number Thirteen: Sailing New Seas." NWC Press. <<u>http://www.nwc.navy.mil/press/npapers/np13/np13pt1.htm/</u>> (20 November 1998).

Schlender, Brent and Peter Drucker. "Peter Drucker Takes The Long View" <u>Fortune</u>. 28 September 1998. Academic Universe/Document. <u>Lexis-Nexis</u>. The Time Inc. Magazine Company. (30 December 1998).

Segal George and Marsha. "Government Lite" <u>Public Management</u>. April 1998. Academic Universe/Document. <u>Lexis-Nexis</u>. International City-County Management Association. (30 December 1998).